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Swiss-Liechtenstein Patent
Swiss-Liechtenstein Patent Protection Treaty of December 22, 1978

SWISS PATENT CH 639 884 A5

Int. Cl.[3] : B 22 D 11/14

Application number: 5568/79

Application date: 14.06.1979

Patent issue date: 15.12.1983

Publication date: 15.12.1983

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Title: Horizontal casting facility for continuous and simultaneous production of two or more continuous casting sections, particularly round billets

The pouring device (1) is divided into a casting channel and casting gate segment (6, 7, 8) coordinated with each metal mould and with a rapid drain opening with plug (10). Supply of liquid metal can be separated for each casting gate segment (6, 7, 8) and independently interrupted from the others in order, where necessary, to interrupt the casting process of one strand without disrupting that of the others.

The transport device consists of one transport chain (14) for each strand (13). The links (15) of the transport chains form a V-shaped receiving channel for each strand, whereby the latter is laterally guided over the entire length of the transport device. The transport chains are driven by a common drive, being individually able to be coupled thereto or decoupled therefrom.

CLAIMS

1. Horizontal casting facility for continuous and simultaneous production of two or more continuous casting sections, particularly round billets, with a pouring device that feeds a metal mould for each strand and with a transport device connecting to the metal moulds for transport of the casting strands emerging from the metal moulds, characterized in that the transport device for each strand (13) comprises a transport chain (14) coordinated with each metal mould and laterally guiding the strand (13), whereby a common drive is provided for these transport chains (14),

whereby the transport chains (14) can be individually and independently decoupled from the others, and that the pouring device (1) is divided into a casting channel (2) and casting gate segments (6, 7, 8) communicating therewith for each metal mould (12), whereby each casting gate segment can be independently shut off from the others towards the casting channel, and the space between the shut-off and metal mould can be drained.

2. Horizontal casting facility as claimed in claim 1, characterized in that the individual transport chains (14) are formed from links (15) provided with a V-shaped notch for receiving a strand (13) and in their entirety ensuring lateral guidance of this strand over its entire partial length bearing on the transport device.

3. Horizontal casting facility as claimed in claim 1 or 2, characterized in that the guiding surfaces (16) of the transport chains (14) are formed from ribs (17) running transversely to the transport device.

4. Horizontal casting facility as claimed in any one of claims 1 to 3, characterized in that the drive wheels (18) for the transport chains (14) are seated on a common drive shaft (19) able to be driven by a motor.

5. Horizontal casting facility as claimed in any one of claims 1 to 4, characterized in that the transport chains (14) as a whole are able to be horizontally and vertically adjusted.

The invention relates to a horizontal casting facility for continuous and simultaneous production of two or more continuous casting sections, particularly round billets, with a pouring device that feeds a metal mould for each strand and with a transport device connecting to the metal moulds for transport of the casting strands emerging from the metal moulds.

In previously known horizontal casting facilities of this type, the metal moulds with liquid metal have been fed from a casting gate common to all metal moulds, and the strands emerging from the metal moulds have been taken off by a transport device common to all strands, eg in the form of a transport carpet, roller conveyor, casting table, or puller carriage, for onward transport. A disadvantage of such facilities is that, should any one of the simultaneously produced strands break, the whole casting process as well as further casting of the other strands usually has to be interrupted. Where, as has also already been tried, partial further casting is enabled simply through the respective tapping spout of the casting gate common to all strands being plugged, such plugging seriously disrupts metal flow in the gate, with the flow around the tapping spout being almost entirely brought to a standstill. This very readily leads to the risk of metal being frozen in place.

Another important disadvantage of known casting facilities mentioned above resides in unreliable, labile guidance of the casting strands on the level bearing surface of the transport device. A known remedy intended to achieve better guidance of strands in the transport device zone is to arrange for roof-shaped single rollers or double guide rollers to press down on individual strands from above. Because of the short guidance distance afforded by such measures, they do not generally satisfy the requirements of completely reliable guidance as needed for separation of the strands downstream of the transport device and as a basic prerequisite of good strand surface condition and thereby low-breakage casting.

The invention is intended to resolve the task of arranging a horizontal casting facility of the type described in the introduction in such a way that, on the one hand,

reliable and precise guidance of each strand in the transport device zone is ensured and, on the other, trouble-free interruption of metal supply for individual strands is possible without interruption of the casting process of remaining strands as well as restarting of interrupted casting processes during and without disruption of the casting process of other strands.

For this purpose, the invention relates to a horizontal casting facility of the type described in the introduction, characterized in that the transport device for each strand comprises a transport chain coordinated with each metal mould and laterally guiding the strand, whereby a common drive is provided for these transport chains, whereby the transport chains can be individually and independently decoupled from the others, and that the pouring device is divided into a casting channel and casting gate segments communicating therewith for each metal mould, whereby each casting gate segment can be independently shut off from the others towards the casting channel, and the space between the shut-off and metal mould can be drained.

Individual transport of the strands on the transport device, particularly by means of transport chains providing lateral stoppage for each strand, ensures precise guidance of each individual strand over the entire length of the transport device, whereby the risk of breakages is significantly reduced. Should a breakage occur, further transport of only the affected strand can be interrupted, whereas the casting process of the other strands can continue without disruption, and supply of liquid metal can only ever be interrupted through the affected casting gate segment being shut off precisely for the strand concerned. Since the shut-off casting gate segment can moreover be completely drained from liquid metal retained inside, metal freezing can be prevented.

An embodiment example of the invention is explained in more detail below with reference to the attached drawings,

Fig. 1 schematically shows a longitudinal section of the casting facility according to the invention along a vertical longitudinal plane.

Fig. 2 shows a section along line II-II in Fig. 1.

Fig. 3 shows a plan view of the facility shown in Figs. 1 and 2.

Fig. 4 shows an enlarged cross-section through an individual link of the transport chain.

Fig. 5 shows a section along line V-V in Fig. 4.

The horizontal casting facility shown in the schematic general view in Figs. 1 to 3 is arranged for continuous, simultaneous casting of three round billets 13. Number 1 is generally used to indicate the pouring device for liquid metal in the device. This pouring device, as best evident from Fig. 3, is divided into actual casting channel 2, which, via inlet channels 3, 4, and 5 with three casting gate segments 6, 7, and 8, communicates with one of three round billets 13 to be produced. Each of three round billets 13 to be produced can be individually shut off against casting channel 2, appropriately in the region of inlet channel 3 coordinated therewith, by means of devices not shown, eg slide 9. Arranged in the casting direction behind slide 9 is a rapid drain opening with plug 10 (Fig. 1) in the base of each casting gate segment 6, 7, and 8. Collecting channel 11 ending in a tank (not shown) is located under the three drainage openings.

As can be quite straightforwardly understood from the foregoing, should eg any one strand break, relevant casting gate segment 6, 7, and 8 is shut off and metal mould 12 forming the space between the shut-off and strand is drained through relevant plug 10 being opened via channel 11 into tank 2 without any impairment of the casting process of the other two strands occurring and even without their further cast-

ing also having to be interrupted. After appropriate repair work in the strand breakage zone is completed, it is then possible by opening slide 9, again without any disruption of the casting processes of the remaining strands, to receive metal from the interrupted casting process of affected round billet 13 now again flowing from casting channel 2 into the casting gate segment concerned.

Round billets 13 emerging from their metal moulds 12 pass to a transport device. The latter comprises transport chain 14 coordinated with each individual round billet 13. Each of these transport chains 14 is composed of guidance and transport links 15, whose configuration and arrangement are shown in more detail in Figs. 4 and 5. These guidance and transport links 15 particularly incorporate side surfaces 16 running inclined in the main direction, which in their entirety for each round billet 13 form a V-shaped guide wherein round billet 13 is secured against lateral displacement and moreover over its entire partial length bearing on the transport device. This ensures reliable, precise bilateral guidance of each individual strand emerging from the metal moulds from its exit from the metal mould until it leaves transport chain 14. Guiding side surfaces 16 of individual links 15 are moreover appropriately provided inside with ribs 17 running transversely to the transport direction, being arranged to counteract any sliding of the round billet relative to the transport chain.

As shown in Figs. 1 to 3, it is also appropriate to arrange over each transport chain individually hoistable press-down roller 22 in order to be able to press each round billet 13 on to each transport chain in a manner known per se.

On the side of pouring device 1, transport chains 14 are each guided via tensioning wheel 23 arranged on individually adjustable axes 24. At the other end of the transport chain remote from pouring device 1, transport chains 14 are each guided via drive wheel 18. Drive wheels 18 for three transport chains 14 are seated on common drive shaft 19, being individually able to be coupled in relation to the same via controllable couplings 20, appropriately toothed couplings, known per se. Geared motor 21 is used for driving drive shaft 19 and thereby transport chains 14 in order to take out the strands from the metal moulds depending on the casting speed.

The transport chains together with their drive are arranged in a support frame, which, both along its horizontal casting axis and also in terms of its height, is adjustable eg by means of set screws. The first noted adjustability allows the intermediate arrangement of additional cooling rings where appropriate or necessary, whereas the height adjustability allows precise levelling of the transport chain in relation to the casting axis.

2 sheets of drawings